

compresso, 0 mm. 5 longo, apicem versus attenuato, antherae medium versus inserto; ovarii rudimento trisulcato 1 mm. 4 alto. Flores ♀ similes sed sepala petalis paulo parviora. Fructus ovoideus (15-14 × 8-10 mm.) stigmatum residuis basilaribus, endocarpium fibris complanatis.

Bords des cours d'eau, de 100 à 300 m. d'altitude; fl. : décembre-janvier; fr. : juin-août.

OUEST (Nord) : bassin moyen de la Mananjeba, *Perrier* 15800; berges de la rivière Analabe, affluent du Rodo, *Humbert* 19.032.

Cette espèce est voisine des *C. arenarum* Jum. et Perr. et *C. lutescens* Wendl., mais elle diffère des deux par un port plus grêle, des feuilles plus petites et sans pétiole, des fleurs globuleuses et plus petites, les bractées des glomérules très arrondies et des fruits plus petits. Les stipes de ce palmier sont en outre parfois ramifiés; ce qui ne s'observe jamais sur les autres *Chrysalidocarpus*.

THE GENUS LOMARIOPSIS IN MADAGASCAR AND THE MASCARENE ISLANDS

By R. E. HOLTUM.

The genus *Lomariopsis* was founded by FÉE for a group of climbing acrostichoid ferns, which he rightly distinguished from *Stenochlaena*. Later authors, however, with the exception of METTENIUS, did not recognise this distinction, and until recent years all the ferns were included in *Stenochlaena*. In 1932¹, I made a revision of the species concerned in the Malayan region, and gave reasons for separating the three genera *Stenochlaena*, *Lomariopsis* and *Teratophyllum*. Of these, *Lomariopsis* extends throughout the wetter parts of the tropics, and my study of the Malayan species therefore represented only a part of it. I have now attempted to make a full survey of the genus throughout its range, and hope later to publish an account of this work. The present paper is confined to the species of Madagascar and the Mascarene Islands, which are best represented in the Herbarium

* *Gardens, Bulletin, S. S.*, vol. 5, p. 245-313.

of the Muséum d'Histoire Naturelle at Paris. I visited the herbarium in February 1938, and am very grateful to Prof. H. HUMBERT and his staff, particularly to Madame M. L. TARDIEU-PLOT, for their kindness in facilitating my studies.

The main characteristics of the genus *Lomariopsis* are set forth in my earlier paper, but the species of the Madagascar region show certain peculiarities not seen in the Malayan species, some of them matching the genus *Teratophyllum* in two characters which are discussed in the following paragraphs.

1) In the species *L. crassifolia* and *L. longicaudata* the terminal pinna of the acrophylls is completely or almost completely aborted, and an articulated lateral pinna takes the terminal place, as in all species of *Teratophyllum*.

It is remarkable that a group of three species in Cuba and Jamaica also show this character, which occurs in none of the numerous other species of *Lomariopsis*, either in the Old or the New World. It is to be presumed that the Madagascar and West Indian species have independently acquired this character, at a late stage of the development of the genus, whereas in *Teratophyllum* and *Lomagamma*, where it is universal, the character has doubtless existed throughout their history as genera. It seems as if the normal terminal pinna, which is a direct continuation of the rachis, could not acquire an absciss layer in the same way as the lateral pinnae, and that a completely deciduous condition could only be reached by abortion of the terminal pinna. This condition has never been reached in *Stenochlaena*. In *Lomagamma* and *Teratophyllum* I have not found any rudiment of a terminal pinna in acrophylls, but in the species of *Lomariopsis* here mentioned the rudiment is often to be found.

The species of *Lomagamma* and *Teratophyllum*, so far as I have seen them, grow only in the most moist and shady forest. The species of *Lomariopsis* usually occur in somewhat less humid conditions, and all *Stenochlaenas* seem to be sun-ferns. The character of articulation of the leaflets is doubtless of advantage in case of dry weather, and it may be significant that it is those genera adapted to the most humid conditions which have all

pinnae articulate ; such genera would be the most sensitive to any onset of dry weather. It is to be noted that it is always the fronds on the high-climbing rhizomes, far above the water-supply of the soil, which have all pinnae articulated ; the condition rarely occurs in bathyphylls. An onset of dry winds might seriously affect the acrophylls while leaving the bathyphylls hardly affected.

2) In young plants, probably of *L. buxifolia* and *L. cordata*, the fronds are of closely similar form to the less dissected bathyphylls of *Teratophyllum*, the basal pinnae being borne close to the rhizome and overlapping it.

I restrict the term *bathyphyll* to leaves borne in the lowest levels of the forest, as against *acrophyll* for leaves borne at high levels. It is true that all climbing ferns start at the bottom, either on rocks or the bases of tree trunks, so that the fronds of all young plants are in a sense bathyphylls. In *Teratophyllum*, however, and to a less marked extent in *Lomagamma*, the bathyphylls are of a form quite distinct from the acrophylls, and are not confined to young plants, occurring also on new low-level branches of old plants ; such are bathyphylls in the strict sense.

In all the *Lomariopsis* species in the Malayan region and the islands of the Pacific, young plants start with simple lanceolate or linear fronds, these being successively larger up to a limit, beyond which fronds with one or more pairs of lateral pinnae begin to appear, the terminal pinna becoming progressively smaller as the number of lateral pinnae increases. This condition also occurs in a number of species in Madagascar, Africa and America, but in all these countries there are also species which from the beginning have fronds with a number of small lateral pinnae, the terminal one also of about the same size ; an example is *L. sorbifolia*, the young plants of which were described by TROLL (*Flora N. F.* 26 : 398, fig. 3). Several species of Madagascar and neighbouring islands are of this type, and there is also the interesting *L. variabilis*, of which young plants have more or less dissected simple fronds simulating bathyphylls of *Tera-*

tophyllum, but probably derived in quite a different way. The young plants ascribed to *L. buxifolia* and *L. cordata* evidently have their fronds closely appressed to the supporting tree trunk, just as in *Teratophyllum*, with pinnae right to the base ; other species have young plants more like those of *Lomagamma*, with erect fronds on relatively long stipes. The resemblance to *Teratophyllum* noted in the two species is probably to be regarded as an independent parallel development, probably connected with the habit of growth.

Including the species of Africa and America, the genus *Lomariopsis* still remains with its principal characters as set forth in my paper of 1932, but a rather more elaborate general description is seen to be needed ; this I hope to publish later. In the meantime it may be sufficient to indicate that *Lomariopsis* is distinguished from *Teratophyllum* (probably its nearest relative) in the following characters :

1. Rhizome always with several rows of leaves on adult plants.
2. Always a gradual transition from the leaf-form of young plants to that of adult plants.
3. In all but a few species the terminal pinna is continuous with the rachis and not articulate.
4. The veins of sterile pinnae are confluent at their ends with the more or less cartilaginous margin of the pinna ; veins of fertile pinnae are free within the membranous margin.
5. In all known cases the fertile pinnae lack any vascular supply additional to the normal venation.

In one section of *Teratophyllum* (see *Gard. Bull. S. S.* vol. 8, p. 355, 1938), the rhizome has several rows of fronds, but in this section the fronds show a clearly marked distinction from *Lomariopsis* in other characters. Character 5 above mentioned may not be universal, but I believe it will prove to be so when further species are examined. If fully substantiated, it indicates a primitive character for the genus, as compared with most other acrostichoid ferns, which have some form of additional vascular supply in the fertile pinnae.

KEYS TO THE PRESENT SPECIES

Young plants

Earliest fronds simple, deeply dissected. *L. variabilis*

Earliest fronds, if simple, entire.

Earliest fronds simple

First lateral pinnae elongate, base cuneate

L. Boivinii

? *L. crassifolia**

First lateral pinnae suborbicular

L. madagascarica

Earliest fronds pinnate

Pinnae imbricate, bases subcordate

L. cordata

Pinnae not imbricate, bases rounded or cuneate.

Pinnae caudate at apex

L. longicaudata

Pinnae not caudate

Pinnae relatively narrow, acute at apex

L. Pervillei

Pinnae relatively broad, rounded at apex

Pinnae to about 6-jugate, stipe long *L. pollicina*

Pinnae more numerous, stipe short *L. buxifolia*

Acrophylls

Apical pinna almost or quite aborted

Rhizome scales very narrow, almost black

L. longicaudata

Rhizome scales 1 mm. wide, red-brown

L. crassifolia

Apical pinna not aborted

Lateral pinnae stalked to 6 mm.

L. variabilis

Lateral pinnae sessile or shortly stalked

Lateral pinnae to about 3 cm. long

L. buxifolia.

Lateral pinnae longer

Lateral pinnae imbricate, cordate at base

L. cordata

* Young plants not seen.

Lateral pinnae not imbricate nor cordate

Lateral pinnae to about 6-jugate *L. Boivinii*

? *L. madagascariensis***

Lateral pinnae more numerous

Fertile pinnae 2 mm. wide *L. Pervillei*

Fertile pinnae 5 mm. wide *L. pollicina*

Lomariopsis Boivinii Holttum, sp. nov.

Rhizoma apicem versus paleis angustis, brunneis, ad 1 cm. longis vestitum. Stipites frondium sterilium ad 26 cm. longi, brunnei, basin versus paleis eis rhizomatis similibus, cetera paleis linearibus aspersis vestiti. Pinnae laterales 3-5-jugatae, obliquae, sessiles, 3-4 cm. inter se distantes, superiores maximae; pinna terminalis ad 24 cm. longa et 5,5 cm. lata, basi cuneata, apicem versus sensim attenuata. Pinnae laterales maximae 16 cm. longae, 4,5 cm. latae, basi inaequaliter, postice angulo 45°, antice anguste, cuneatae; margines minute sinuosae, margo inferior omnino curvata, margo superior plerumque cum costa parallela; apices pinnarum submucronati, interdum subcaudati; textura tenuis; color in sicco brunnescens, supra quam subtus fuscior; venae tenues, utrinque prominentes, angulum 70° cum costa formantes, c. 1.2 mm. inter se distantes. Stipes frondis fertilis ad 44 cm. longus; pinnae fertiles laterales c. 4-jugatae, sessiles vel subsessiles, ad 10 cm. longae et 8 mm. latae; pinna terminalis fertilis ad 16 cm. longa et 1 cm. lata.

TYPUS : Nossibé, *Boivin* 1947/2, in Herb. Mus. Hist. Nat. Paris.

The type of this species is probably a more fully developed form of what CHRISTENSEN called *Stenochlaena madagascariensis* var. *cuneata* (*Dansk Bot. Ark.* 7: 109, 1932). The specimens so referred (Betampona, *Perrier* 17484) are clearly young plants, bearing simple fronds as well as later ones with a few lateral pinnae; the fact that fertile fronds are also produced is perhaps an indication that the species has a tendency to produce them at a stage when the vegetative form has not reached its full development; such a tendency occurs in isolated cases in many fern genera. *S. madagascariensis* Bonap. was itself based on a young (and sterile) plant, and the specimen is a poor one. In my judgement the specimens referred to var. *cuneata* differ from the type of the

** Fully adult plants not seen.

species so much as to make a specific distinction certain ; I would however have hesitated to base a new species upon them, in view of their probable immature condition. The presence of BOIVIN's excellent specimens provides a much surer foundation for a new species, distinct from all others in Madagascar in its few rather broad lateral pinnae with narrowly cuneate base (the upper side of the base of the lower pinnae, as in most species of *Lomariopsis*, is broader than in the upper pinnae).

Assuming that *S. madagascariensis* var. *cuneata* represents a young stage of *L. Boivinii*, we may add the following as a probable addition to the description of the species : young plants at first with simple fronds, up to 36 cm. long and 4 cm. wide, later with one or more pairs of lateral pinnae ; fertile fronds sometimes produced from the stage with 2 pairs of lateral pinnae.

The distinctions from *L. madagascariensis* are : scales longer and more spreading, lateral pinnae elongate, never suborbicular even in young plants, their bases narrowly cuneate, never widest close to the apex, the whole plant usually drying reddish brown, not olivaceous as in *madagascariensis*.

The other specimens probably referable to this species are as follows :

Prov. Andovoranto, Dist. Anivorano, 200 m., *Viguiet et Humbert* 566. Fasina, R. *Decary* s. n. 16. II. 1920. These two are young plants clearly the same as the type of *S. madagascariensis* var. *cuneata*.

Source of the Sembiram River, *Last* s. n. at Kew. This is a larger frond with three pairs of lateral pinnae, quite like the type of *L. Boivinii*. With it is a young plant carrying fronds about 14 by 2.5 cm., pinnae 12-jugate. This cannot be *L. Boivinii*, unless I have quite misunderstood the species ; it is perhaps a young plant of *L. cordata*, the type of which was found in the same part of Madagascar.

Titry, and Tanambe, *Warpur*, s. n., at Kew. Both these specimens were named var. *cuneata* by CHRISTENSEN. They agree with PERRIER's specimen, drying very brown, and have up to 3 pairs of lateral pinnae, quite small, about 3 times as long as

broad, with narrow cuneate bases. The largest pinnae are very close to those of LAST's specimen, but the lowest pinnae on the same frond are much smaller (6 cm. long, the upper 14 cm. long). They are presumably from young plants of *L. Boivinii*.

Mayotte, Comoro Islands, *E. Marie* s. n. 1882, at Paris. This frond has 6 pairs of lateral pinnae, the largest 20 by 4 cm. It agrees well in general character with the type of *L. Boivinii* and may perhaps represent the fully mature condition of the species. LAST's specimen is from the north of Madagascar, and it is not unlikely that a species occurring there might also occur on Mayotte. The types of both *L. Boivinii* and *S. madagascariica* var. *cuneata* are from the low country of the east coast.

Lomariopsis buxifolia (Kze) Fée, *Hist. Acrost.* 69. 1845.

Acrostichum buxifolium Kze. *Farnkr.* 1 : 171, pl. 72, 1845.

This species is excellently figured by KUNZE. The type was collected in Madagascar by GOUDOT, and is stated to be in DELESSERT's herbarium. There is a small specimen of GOUDOT's in the BONAPARTE herbarium which exactly agrees with the figure and is probably part of the original collection. The remarkable feature of the species is its small size, the sterile pinnae close, to about 15-jugate, exactly ovate in shape, commonly about 2.5 cm. long ; the fertile fronds rather longer, the pinnae to about 2.5 cm long and 2 mm. wide.

Apart from the specimen of GOUDOT's above mentioned, I have seen no other fertile specimens of this species, and some of the plants probably to be referred here are clearly very young. They present considerable resemblances to young plants of *L. pollicina*, and I am not certain of their true identity. While true *L. pollicina* seems to be confined to Mauritius, young stages of a closely similar nature, which I would regard as probably *L. buxifolia*, have been collected both in Madagascar and Mauritius. More field study is needed to provide a complete picture of the developmental stages of these species. The young plants referred to have the lowest pinnae overlapping the rhizome, as

in bathyphylls of *Teratophyllum*. In this they agree with young plants referred to *L. cordata* but differ in the pinnae not overlapping, not subcordate at base, and with upper surface shining, not dull.

Lomariopsis cordata (Bonap.) Alston, *Journ. Bot.*, Suppl. 1934, p. 6.

Stenochlaena cordata R. Bonap. *Notes Ptérid.* 4 : 73, 1917.
C. Chr. *Dansk Bot. Ark.* 7 : 108, pl. 41, fig. 1, 1932.

The type of this species is from the Montagne d'Ambre, 800 m., coll. *Perrier*, n° 7498, in the BONAPARTE herbarium. It is very distinct from all other *Lomariopsis* in Madagascar, having many short pinnae (to 27-jugate), the largest about 3.7 by 1.2 cm., so close that they overlap, their bases more or less cordate, the upper ones gradually reduced, the apical pinna with a broad unequal cordate base, the stipe very short. The fertile fronds of the type are immature, so that it is impossible to say how wide the pinnae are when fully expanded. The rhizome scales are broad, appressed ; young fronds are also abundantly provided with linear brown scales.

I have seen no other collection of this species in an adult state, but there are several specimens which probably represent young stages. These have slender climbing rhizomes bearing alternate slightly ascending fronds, the pinnae multijugate, short, with blunt apices and subcordate bases, the lowest reflexed to overlap the rhizome as in bathyphylls of *Teratophyllum*. They resemble the young plants referred to *L. buxifolia* in general aspect, but differ in the points mentioned under that species ; the shape of the pinnae agrees well with the smaller pinnae of the type of *L. cordata*, but the margins are slightly toothed. I have little doubt that they will prove to be young plants of this species. Such young plants were collected in northern Madagascar by LAST in association with large fronds now ascribed to *L. Boivinii*, but I do not think the two can be from the same plant.

Lomariopsis crassifolia Holttum sp. nov.

Rhizoma paleis rufo-brunneis 8 mm. longis, 1 cm. latis, vestitum. Stipites frondium sterilium 5-8 cm. longi, rufo-brunnei. Lamina sterilis ad 45 cm. longa et 15 cm. lata; pinnae c. 14-jugatae, c. 2.5 cm. inter se distantes, obliquae, infimae et supremae leviter reductae; pinna terminalis plerumque fere abortiva, pinna articulata locum terminalem occupans. Pinnae maximae c. 10 cm. longae et 2 cm. latae, basi postice angulo c. 45° cuneatae, antice anguste rotundatae, apice submucronatae; margines plerumque parallelae, minute sinuosae; textura subcoriacea; color in sicco olivaceus, supra quam subtus multo fuscior; venae supra tenues, prominentes, subtus latiores, angulum 70° cum costa formantes, c. 1 mm. inter se distantes. Stipes frondis fertilis 8 cm. longus, lamina 40 cm.; pinnae c. 15-jugatae, infimae breve petiolulatae, ad 9 cm. longae et 4 mm. latae.

TYPUS : Madagascar, *Humblot* 529, Herb. Mus. Hist. Nat. Paris.

Other specimens : Isotype in Herb. Kew. *Humblot*, 442 p. p. in Herb. Paris. (The remaining part of *Humblot* 442, including all fertile fronds, is *Blechnum xiphophyllum*).

This species resembles *L. longicaudata* in the abortion of the true apical pinna, but differs in having shorter, broader pinnae of different shape at the base, and in the shorter, broader, much paler scales on rhizome and base of stipes.

The specimens under *Humblot* 442 referred to this species differ from the type in having fewer pinnae (6-7-jugate), some of them larger, the largest being 13 by 3.5 cm., and the apex mucronate; all show the aborted terminal pinna. It appears to me probable that these are fronds from young plants.

The general appearance of the type of *L. crassifolia* is rather similar to that of some specimens of *L. pollicina*, but the aborted apical pinna provides a sharp distinction; the lateral sterile pinnae are also narrower at the base, usually more coriaceous in texture, and the fertile pinnae narrower than in *L. pollicina*. It is also probable that young plants of *L. crassifolia* are quite different from those of *L. pollicina*, the former having few large mucronate pinnae, the latter much smaller pinnae with rounded apex. There is every indication that *L. pollicina* is confined to Mauritius and Réunion, and *L. crassifolia* to Madagascar.

Lomariopsis longicaudata (Bonap.) Holttum comb. nov.

Stenochlaena longicaudata Bonap. *Notes Pterid.* 5 : 93. 1917.

S. pollicina var. *longicaudata* C. Chr. *Dansk Bot. Ark.* 7 : 108, pl. 41, fig. 2, 1932.

The type of this species was collected in Prov. Andovoranto, District Anivorano, by VIGUIER & HUMBERT, n^o 573, and is in the BONAPARTE herbarium. It is sterile, and evidently represents a young stage. There are 7 pairs of pinnae, 7-8 cm. long and 1.5 cm. wide, mucronate-caudate.

In the Paris herbarium is a collection which seems to me to represent the adult state of the species. There are two sheets, one evidently representing the fully mature condition, the other more like the type of *L. longicaudata*; both agree with the type in the characteristic scales. The specimens are labelled : Ste Marie, Boivin 1589. The fully adult stage is described as follows.

Rhizome scales copious, long, spreading, narrow, very dark brown; linear dark brown scales also copious on rachis. Stipes to 16 cm. long, frond 55 cm. long; pinnae to about 19-jugate; apical pinna usually almost aborted, the apical position taken by an articulated lateral pinna; middle pinnae largest, lowest pinnae slightly reduced and more distant. Largest pinnae to 14 by 1.8 cm, sessile, base very narrow, rounded, gradually widened to near apex, then more or less suddenly narrowed to caudate tip; colour very dark, the midrib tending to dry reddish above; texture subcoriaceous. Fertile pinnae about 17-jugate, apical pinna very much reduced (rounded), lateral pinnae to 7 cm. long and 4 mm. wide.

The specimen representing a younger stage has shorter, rather broader pinnae, more abruptly contracted near apex, somewhat thinner in texture.

At Kew is a collection of WARPUR, from Tanambe, also referable to this species.

L. longicaudata is thus shown to be a most distinctive species, different from all others in Madagascar in its scales, and in the shape of its pinnae. It agrees with *L. crassifolia* in the abortion

of the apical pinna. Young plants evidently have pinnate fronds with several pairs of pinnae from an early stage.

Lomariopsis madagascariensis (Bonap.) Alston, *Journ. Bot. Suppl.* 1934, p. 6.

Stenochlaena madagascariensis Bonap. *Notes Ptérid.* 4 : 74. 1917. *Ibid.* 5 : 84. C. Chr. *Dansk Bot. Ark.* 7 : 109, t. 41, fig. 3-4, 1932.

This species was described by BONAPARTE from young plants, and I have seen no adult plants which could be clearly referred to it. Full material for comparison with other species is therefore not available. Some remarks on the subject will be found under *L. Boivinii*.

The type of the species is labelled : Forêt d'Analamazaotra, 800 m., *Perrier de la Bâthie* 6161. The smaller plants in the collection have few short suborbicular pinnae below a large terminal one ; one frond shows a transition to larger lateral pinnae. The larger plants have a stout rhizome (apex missing) ; the scales on the bases of the stipes are appressed, short, ciliate, medium brown. The largest fully expanded frond has 4 lateral pinnae on one side and 3 on the other ; the lowest pinnae are small (5 by 2 cm.), the highest 22 by 3.8 cm., nearly as large as the apical pinna, the base cuneate, widening to the apex, which is suddenly narrowed to a short mucronate tip. There are no fertile fronds

Lomariopsis Pervillei Mett. Kuhn, *Fil. Afr.* 53. 1868.

The type of this species was collected by PERVILLE in the Seychelles (n° 86) ; there is a duplicate of the collection in the Kew herbarium. It is a very distinct species, especially in its very narrow fertile pinnae (only 2 mm. wide) ; the sterile pinnae have somewhat the shape of those of *L. variabilis*, but they are sessile and thicker in texture. Young plants collected by J. S. GARDINER (Sealark Exp. 1908), in the Kew herbarium, have small fronds (as small as 12 cm. long including the stipe) of the same form as those of the adult plant, the pinnae to 12-jugate, the lowest pinnae small, rounded. The young plants therefore

differ quite markedly from those of *L. variabilis* and also from *L. pollicina*.

All collections of *Lomariopsis* from the Seychelles are this species. *J. Horne*, 679 at Kew, is labelled « common in Mahé on trees », and a collection of *J. S. GARDINER* is labelled « climbing fern, common over 1000 ft. ».

In the Paris herbarium is a sterile specimen of *Boivin's*, labelled Comoro Islands, which appears to be this species, and in *CHRISTENSEN's* herbarium is a fragment of a collection from Mayotte (*Marie* s. n. 1882) with a narrow fertile pinna. These appear to indicate the presence of the species also in the Comoro Islands, though it has not been found in Madagascar. The question evidently needs further investigation.

Lomariopsis pollicina (Willem.) Mett. Kuhn, *Fil. Afr.* 53. 1868.

Osmunda pollicina Willem. *Ann. Bot. Usteri* 6, 18 : 61. 1796.

Lomaria fraxinea Willd. *Sp. Plant.* 5 : 294. 1810.

Acrostichum lomarioides Bory in Bélanger, *Voy. Bot.* 21, pl. 2, 1833.

Lomariopsis Boryana Fée, *Hist. Acrost.* 68. 1845.

I have not seen the type of this species, but as it apparently came from Mauritius there can be little doubt of its identity with the plants commonly so named. Of the other names mentioned above, *Lomaria fraxinea* is a direct synonym, and *L. Boryana* a direct synonym of *A. lomarioides*, concerning which further remarks will be found below.

L. pollicina seems to be confined to Mauritius and Réunion ; the specimens from Madagascar referred to it are in my opinion quite different species. Young plants are well represented in collections. They have several pairs of short elliptical pinnae with rather broadly rounded base and rounded apex, the apical pinna similar. Adult plants have sterile pinnae to at least 15-jugate, the largest about 9 by 1.8 cm, sessile, the base broadly cuneate above, narrower and rounded below, the apex sometimes

submucronate, the texture firm, not thick; the fertile pinnae sessile, to 8.5 by 0.5 cm. The scales are pale brown.

I have seen the type of *L. lomarioides* at Paris. The rhizome is slender, and the fronds are smaller, with fewer shorter pinnae, than in adult *L. pollicina* as above described, and the pinnae rounded at apex. On the same sheet as the plant figured by BORY is another, less mature specimen, which still has some pinnae partly fertile. In my opinion, the type of *L. lomarioides* is a young stage of *L. pollicina* which is prematurely fertile (see remarks under *L. Boivinii*). The largest fronds have the upper pinnae acute at the apex, thus tending towards the condition of adult *L. pollicina*.

Lomariopsis variabilis (Willd.) Fée, *Hist. Acrost.* 70, pl. 31, 32. 1845.

Lomaria variabilis Willd. *Sp. Plant.* 5 : 294. 1810.

Lomariopsis cuspidata Fée, *Hist. Acrost.* 68, pl. 27. 1845.

WILLDENOW's type came from Mauritius. I have not seen it, but there can be no doubt that it is identical with the fern excellently figured by FÉE, a species quite distinct from all others in its remarkable juvenile stage.

Young plants have large simple fronds, the lamina deeply dissected in the basal half (sometimes quite to the apex), the segments always broadly adnate to the costa, never developing into true pinnae. Later fronds have a few pairs of rather long-stalked lateral pinnae, the lowest at least dissected in the same way as the earlier simple fronds. The fully adult plant has numerous rather large pinnae, on stalks 6 mm. long, the base rather narrowly cuneate, the apex acuminate, the midribs usually reddish when dry. The fertile pinnae are also stalked to 6 mm. and are about 5 mm. wide.

There are numerous collections from Mauritius and Réunion, in the herbaria at Paris, Kew, the British Museum and Brussels; I do not think it is necessary to enumerate them.

SPECIES DUBIA

Lomariopsis orbiculata (Poir.) Alston, *Journ. Bot. Suppl.* 1934, p. 6.

Polypodium orbiculatum Poir. *Encyc.* 5 : 525. 1804.

The type of this species is a specimen collected by COMMERSON, in Herb. DESFONTAINES ; the locality given is Java. I have not seen it, and the description is inadequate. KUHN included it in the synonymy of *L. pollicina* var. *buxifolia*, but it is not certain that he saw the type. If it really came from Java, it must have been a different fern, but it may have been wrongly localised. If the type is found and proves to be identical with *L. buxifolia*, then the name *L. orbiculata* must have precedence.

DOUBTFUL SPECIMENS

1. Antananarivo, *Miss Gilpin*, s. n., at Kew. This is rather like *L. longicaudata*, but the pinnae are broad at the base, and the frond shows no sign of aborted apex. There is no rhizome, so that scales are not available.

2. Comoro Islands, Johanna Is. *J. Kirk* (LIVINGSTONE'S Zambesi Expedition) in Herb. HOOKER. at Kew. This is a young plant, the fronds with short stipes, pinnae 8-jugate, acute. It is not *L. pollicina*, which has shorter broadly rounded pinnae at this stage. It has too many pinnae for *L. Boivinii*. It probably represents a new species.

3. « Tree ferns, first met with in forest by the sea at Erangey river and to 3500 ft (Mandrahoudz). » A specimen so labelled at Kew has no collector's name, and I have not been able to identify the handwriting. There are two sterile fronds on a rhizome, probably of almost adult size, the pinnae close (imbricating), to 7 by 2 cm., with broadly truncate bases and slightly mucronate apices, the rachis and costae red-brown. I cannot identify this specimen with any species mentioned in this paper, and think it probably represents a new species.
